SOME interesting facts concerning the velocity of crystallisation have been found as the result of an investigation by Dr. von Pickardt, published in the current number of the *Zeitschrift für physikalische Chemie*. The velocity of crystallisation of supercooled benzophenone is diminished to the same extent when equimolecular quantities of the most various substances are dissolved in it. The diminution of the velocity for any one dissolved body is, moreover, not proportional to its concentration, but to the square root of this. The regularities which have been observed may be utilised in a practical way for the determination of the molecular weights of substances dissolved in the crystallising medium.

A NEW fortnightly journal—the *Biochemisches Centralblatt*—is to make its appearance very shortly. The editor is Dr. Carl Oppenheimer, and the directors of the undertaking are all men well known for their contributions to biochemistry. It is not intended that the new journal shall serve as a medium for the publication of original papers; its chief object will be to give an abstract of all papers dealing with biochemical subjects published in other journals. The only original contributions which will find a place in the *Centralblatt* will be reviews of the condition and progress of small specialised branches of the subject, and it is proposed that each fortnightly issue shall contain such a *résumé*. The first number will appear early in December. The publishers are Gebrüder Borntraeger, Dessauer Strasse 29, Berlin S.W., and the yearly subscription is 30 marks.

THE examination of the electrical conductivity of a large number of substances dissolved in liquid hydrocyanic acid by Messrs. Kahlenberg and Schlundt (*Journal of Physical Chemistry*, October, 1902) has shown that while some salts are not such good conductors as their corresponding aqueous solutions, others conduct much better. Solutions of acids in liquid hydrocyanic acid are generally much poorer conductors than aqueous solutions, and the authors conclude that electrolytic conducting power is essentially determined by the specific nature of the compound formed when solute and solvent act on each other to form the solution. Certain chemical changes which have been investigated in hydrocyanic acid solution present remarkable peculiarities. It is found, for instance, that whereas trichloracetic acid readily attacks metallic magnesium and sodium carbonate, it has no action on zinc or calcium carbonate.

THE question of the influence of moisture on the combination of hydrogen and chlorine has been advanced another stage by the recent experiments of Messrs. Mellor and Russell. Great precautions were taken to ensure the purity of the gases used in the experiments, the hydrogen being prepared by the action of steam on metallic sodium and the product purified by absorption in palladium. Pure chlorine was obtained by the electrolysis of fused silver chloride. After the gases had been left in contact with phosphorus pentoxide for nine months in the dark, it was found that a small spark at once caused a violent explosion, and complete combination took place. The mixture of dry gases could, however, be heated to 450° C. without explosion taking place, whereas a moist mixture in a similar bulb exploded at about 260° C. With the dry mixture it was further found that in sunlight no explosion takes place, but that the combination of the gases is very slow. The experiments show clearly that the presence of moisture has very considerable influence on the union of the two gases.

THE additions to the Zoological Society's Gardens during the past week include a Lesser White-nosed Monkey (*Cercopithecus petaurista*) from West Africa, presented by Mr. W. A. Filbert; a Vervet Monkey (*Cercopithecus lalandii*) from South Africa, presented by Mr. C. A. Rawlins; a Lanner Falcon (*Falco lanarius*) from Egypt, presented by Dixon Bey; a Globose Curassow (*Crax globicera*) from Central America, presented by the Hon. Mrs. Lawly; a Stone Curlew (*Œdicnemus scolopax*) European, presented by Mr. A. W. Arrowsmith; eight Dwarf Chameleons (*Chamaeleon pumilus*) from South Africa, presented by Miss Kay; a Horned Lizard (*Phrynosoma cornutum*) from Mexico, presented by Mr. C. W. Farquharson; seven Viperine Snakes (*Tropidonotus viperinus*) European, presented by the Rev. F. W. Haines; two Smooth-headed Capuchins (*Cebus monachus*) from South-East Brazil, a Macaque Monkey (*Macacus cynomolgus*) from India, six Mountain Witch Ground Doves (*Geotrygon cristata*) from Jamaica, two Changeable Lorikeets (*Ptilosclera versicolor*) from North-West Australia, a Suricate (*Suricata tetradactyla*) from South Africa, deposited; an English Wild Cow (*Bos taurus*) born in the Gardens.

OUR ASTRONOMICAL COLUMN.

ASTRONOMICAL OCCURRENCES IN DECEMBER:—

Dec. 1. 6h. 37m. to 10h. 19m. Transit of Jupiter's Sat. III. (Ganymede).
1. 5h. 15m. Minimum of Algol (β Persei).
4. 7h. 38m. to 8h. 33m. Moon occults β Capricorni (mag. 3·4).
5. 7h. Moon in conjunction with Jupiter. Jupiter, 5° 52′ S.
10. 7h. 8m. to 8h. 22m. Moon occults ζ^1 Piscium (mag. 4·2).
10. 20h. Venus in conjunction with Uranus. Venus, 0° 8′ S.
11–12. Epoch of Geminid meteoric shower.
13. 13h. 53m. to 14h. 56m. Moon occults δ^1 Tauri (mag. 4·0).
13. 14h. 27m. to 15h. 23m. Moon occults δ^2 Tauri (mag 4·7).
14. 16h. 52m. to 17h. 0m. Moon occults 120 Tauri (mag. 5·3).
15. Venus. Illuminated portion of disc = 0·998, of Mars = 0·904.
15. 18h. 24m. to 18h. 42m. Moon occults 26 Geminorum (mag. 5·1).
16. 3h. 34m. to 8h. 29m. Transit of Jupiter's Sat. IV. (Callisto).
16. 5h. 49m. to 6h. 32m. Moon occults λ Geminorum (mag. 3·6).
16. 12h. 27m. to 13h. 20m. Moon occults 68 Geminorum (mag. 5·0).
17. 18h. 37m. to 19h. 36m. Moon occults A^2 Cancri (mag. 5·8).
18. 10h. 9m. Minimum of Algol (β Persei).
21. 6h. 58m. Minimum of Algol (β Persei).
21. 15h. 0m. Moon in conjunction with Mars. Mars, 4° 22′ N.
22. 7h. 0m. Sun enters Capricornus. Winter commences.
30. 0h. 6m. to 3h. 49m. Transit of Jupiter's Sat. III. (Ganymede).
31. 5h. 0m. Moon in conjunction with Saturn. Saturn, 5° 20′ S.

EARLY OBSERVATIONS OF NOVA PERSEI.—In *Circular* No. 66 of the Harvard College Observatory, Prof. Pickering details the results which have been obtained from the measurement of the photographs of the region of Nova Persei which were obtained during the years 1890, 1893 and 1894.

These measurements indicate that the star on the Harvard photographs, which was pointed out by Father Zwack, of the Georgetown College Observatory, and also announced by M. S. Blakjo (*Astronomische Nachrichten*, 157, 193), is a variable which for several years has oscillated between the thirteenth and fourteenth magnitudes, and they also lead to the conclusion that it was, for that period, within one or two seconds of arc of the Nova's position, the difference in position being less than the probable errors of measurement.

COMET 1902 *c* (GRIGG).—A communication from Mr. P. Baracchi, director of the Melbourne Observatory, to No. 3828 of the *Astronomische Nachrichten* states that a search was made for this comet on the first available evening after Mr. Grigg's announcement of its discovery, but without success; nor has the comet been found by any of the Australian observatories. This may be accounted for by the prevalence of bright moonlight on the available nights and by the statement of Mr. Grigg that the object was an extremely faint one.

Enclosed with this communication is a list of the observations made by the discoverer. These observations state that the comet, when first seen, appeared as a faint nebula and was about twice the diameter of Jupiter, the atmosphere never being quite clear. Fourteen observations were made between July 23, when the comet was first seen, and August 3, but after the latter date, bad weather and bright moonlight prevented any further observations.

The instrument used was a 3½-inch refractor, and the N.A. clock stars β, γ and δ Virginis, and ν Virginis, were observed as "near" stars, the apparent position of the last named being taken as 11h. 40m. 52s. + 7° 4′·5.

From the observations made on July 24, 27 and 30, Mr. Grigg has computed the following corrected elements:—

$$T = 1902 \text{ June } 20\cdot33 \text{ G.M.T.}$$

$$\omega = 301^\circ\ 46'\cdot1$$
$$\Omega = 217\ 31\cdot4$$
$$i = 16\ 42\cdot9$$
$$\log q = 9\cdot76618.$$

The position for August 3 as computed from these elements differs by + 1m. 36s. and + 4′ from the observed position on that date.

The computed position at perihelion was $\alpha = 113^\circ\ 34'$, $\delta = + 15^\circ\ 23'$, about 10° north of Procyon, the apparent distance from the sun being 25° E., 6° S. The longitude of the comet from the sun would then increase, and the comet would pass through Cancer towards Regulus until it reached Virgo at the time of its discovery by Mr. Grigg.

APPARENT DEVIATIONS FROM NEWTON'S LAW OF GRAVITATION.—In a paper read at the Göttingen meeting of the Astronomische Gesellschaft on August 4, Herr Peter Lebedew reviewed the various theories which have ever been proposed to account for the apparent contradiction to the law of gravitation as observed in the repulsion of comets' tails from the sun, and he finally accepts the theory of Kepler, which attributes the repulsive force to solar radiation.

The author stated that he had recently confirmed the quantitative relation expressed in the formula for this repulsion, due to Maxwell and Bartoli.

For a spherical body, the diameter of which is great as compared with the wave-lengths of the solar radiation, the resulting action (F) is expressed, in gravitational units, by the formula

$$F = 1 - \frac{1}{10{,}000} \cdot \frac{1}{r\delta}$$

where r is the radius in centimetres and δ is the density of the body as compared with that of water. For dust particles, the diameters of which are comparable with the wave-lengths of the solar radiation, the above relation does not hold good.

This relation explains the varying behaviour of different parts of a comet, for it is obvious that, in a cometary nucleus made up of meteorites of various dimensions and densities, we should expect varying values of F.

TOTAL LIGHT OF ALL THE STARS.—Mr. Gavin J. Burns contributes to No. 3, vol. xvi. of the *Astrophysical Journal* an interesting account of some results he has obtained whilst attempting to estimate the total light of all the stars.

In the first place, he determined the relative brightness of different parts of the sky by observing these different parts through varying thicknesses of ordinary clear glass, and then determining what proportion of the total incident light was transmitted by a unit thickness of glass. He found that the luminosity of the Milky Way varies from two to three times the luminosity of the rest of the sky.

Secondly, he compared the luminosity of the stars with that of the normal sky by the method of putting the star image out of focus until its apparent brightness was equal to that of the surrounding sky; by this process he deduced, from the mean of several independent observations of various stars, that half a square degree of non-Galactic sky gives as much light as a fifth-magnitude star. From further observations, Mr. Burns found that, given a perfectly black background, stars as faint as the eighth magnitude would be readily visible.

WEST INDIAN VOLCANIC ERUPTIONS.

AS a panacea for much ignorance, the subtle fluid of Franklin stands next to superstition. If you cannot explain the angry workings of a volcano by a Pluto, a Vulcan or the struggles of the damned, tell the man in the street that it is due to electricity and he is happy. At the present moment, in seventeen columns of the *Revue Scientifique* of September 6, M. Arthur Tarquin offers to the world an electrical theory of volcanic action which, to a great extent, is novel. At the outset we are told that the earth is entirely governed by the sun, and as its energy varies so will various activities on the earth vary. In establishing such a connection for volcanic activity, M. Tarquin, however, poses as a special pleader. In Tokio, for example, he says that earthquakes (*sic*) are most numerous about the times when sun-spots are at a maximum and *at a minimum*. Dr. E. Naumann, who examined the earthquake registers of Japan, however, failed to find such a connection, and others who have worked with materials relating to other countries have arrived at similar conclusions. As another example of incompleteness in statement, we are told that at the "*moment précis*" of the eruption in Martinique, with a mathematical exactitude magnetic needles at observatories throughout the world were violently disturbed. Even if we admit this to have been the case, we fail to see why similar phenomena were not observed with the more violent eruption which took place the day previously in St. Vincent.

As solar energy penetrates denser and denser layers of the earth's atmosphere, the same becomes warmer and warmer; why, therefore, asks M. Tarquin, should not the internal heat of the earth be explained by similar reasoning? This heating he apparently regards as the result of an increasing resistance to the passage of electricity. The oceans are regarded as vast accumulators. Electric potential is greater where ocean currents meet with obstacles, as, for example, where the Gulf stream passes the Antilles, and it is, therefore, in such places where volcanic activity is pronounced.

So convinced was M. Tarquin of the truth of his theory that he brought the same to the notice of M. le Ministre des Colonies, but it apparently received but small consideration. An official commission was sent to Martinique, but it neither foretold the eruption of July 9 nor that of August 27. On the contrary, it concurred in the return of the inhabitants to their deserted homes and the establishment of brigades of soldiers at Morne Rouge and other places, whilst the chief of the scientific mission issued in the official journal a letter assuring the inhabitants of safety.

This advice M. Tarquin holds to have been based on classical but false hypotheses respecting the cause of volcanic activity, and the exposition of these views lulled many into a feeling of security which they paid for with their lives. The theory of the "pyrophiles" is dangerous to humanity.

The *Revue Scientifique* of September 13 contains a report by the delegates of the Paris Academie des Sciences on the eruption in Martinique of May 8.

This first refers to a chronological account of the eruptions and various volcanic manifestations before the destruction of St. Pierre, and gives a description of the crater of Mont Pelée. By the eruption many fissures were formed, the existence of which is recognised by lines of steam vents. These continued beneath the sea, and accounted, no doubt, for the interruption of the cables and the numbers of dead fish observed on May 5. From these fumaroles steam and sulphuretted hydrogen escape, and round their orifices crystals of sulphur and sal-ammoniac are found. Their temperature at a depth of 0·10m. is about 400° C. Along the beds of the rivers Blanche and Sèche, and particularly near their mouths, these vents are very vigorous, but they vary in their activity and give rise to variations in the temperature of the water in the rivers.

The cinders which fell at Prêcheur formed a layer about 25 centimetres in thickness. At Carbet lapilli one centimetre in diameter were common. Some fragments were larger, and were